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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 201

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2 September 1983

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AUSTRALIA

FRENCH IRKED AT PROTEST ACTION, CONTINUE PACIFIC N-TESTS

Debray: Uranium Cutoff 'Unfriendly'

Melbourne THE AGE in English 22 Jun 83 pp 1, 3

[Article by Ian Davis and Michelle Grattan]

[Text] CANBERRA. — The French Government has told Australia it regards as "unfriendly" the Federal Government's suspension of uranium shipments in retaliation for French nuclear testing in the Pacific.

The Foreign Minister, Mr Hayden, said that in talks yesterday Mr Regis Debray, special envoy for France's President Mitterrand, had said that the French Government viewed Australia's actions as "unfriendly, but wishes that on other matters that we continue to collaborate".

Despite France's strong reaction, Mr Hayden said the only way the two countries could reach agreement on nuclear testing was "by the French stopping testing".

Mr Debray today will meet the Prime Minister, Mr Hawke, who last night returned from his 19-day world trip with the task ahead of him of trying to calm an agitated Labor Party.

Mr Hawke had no comment for reporters when he returned to Canberra last night after flying from Honolulu.

He is known to be confident of handling the dissent within the party over issues such as Timor and economic policy, but is fully aware that the uranium issue will require a more delicate touch.

Mr Hayden said: "Mr Debray made clear the nuclear-testing program will continue."

Mr Debray held separate talks yesterday with Mr Hayden, the Minister for Defence, Mr Scholes, the joint parliamentary committee

on foreign affairs and defence and officials of the Foreign Affairs Department.

Sensitive

Within the Labor Party a good deal hangs on how effectively Mr Hawke lobbies over the next few days, particularly on the uranium issue, the most sensitive of the problems within the party.

Uranium policy is due to be discussed by Caucus's industry committee next Tuesday.

Both uranium and East Timor are listed for discussion at next Wednesday's national executive meeting.

Party sources said last night that the executive's options on how to handle the uranium item were very open. "It depends on what Hawke says and what tactics are adopted," one source said. Options range from the executive giving an interpretation of policy to a move to put off consideration of the question until after discussion in Caucus.

The delicate area of uranium policy is not so much the position on sales to France, but the approval given by the Deputy Prime Minister, Mr Bowen, for two companies to negotiate new contracts.

It is believed that Mr Bowen did not consult Mr Hawke before he did this. It is a matter of dispute whether what Mr Bowen did was inside or outside party policy. But it sparked the strong anti-uranium feeling within the ALP.

After his talks with Mr Debray, Mr Scholes said his response to the French justification of the testing program was that "our positions are irreconcilable".

Mr Hayden said it was up to the Government or the Prime Minister to decide whether to accept the French offer that Australia send scientific observers to the French tests on Mururoa Atoll.

But he made it clear that the offer was unlikely to be accepted. "I don't want it concluded that it is solely a matter of environmental testing and should that come out satisfactorily, the matter is at an end," he said.

"I made it very clear that we are always concerned about the dangers of fallout, but our major concern is with the question of nuclear testing and disarmament."

Mr Hayden said there was no discussion of the French retaliating against Australia because of the ban on uranium exports. He had the "very clear impression" that France was not considering retaliation.

Mr Hayden told Mr Debray that Australia would take the initiative at the South Pacific Forum meeting in Canberra in August and propose a nuclear-free South Pacific.

Mr Hayden said the envoy's response had been to ask for more information about the proposal, but it is believed that privately France regards Australia's proposal as "discriminatory" because it would allow the transit of US nuclear-powered ships, but not French testing.

Mr Scholes said transit rights and nuclear testing were not comparable. "They are exploding devices not in their own backyard but in an area where there is universal opposition to it," Mr Scholes said.

French Envoy's Statement

Sydney THE AUSTRALIAN in English 30 Jun 83 p 2

[Article by Peter Gibson]

[Text] The French Government has totally rejected Australia's demand to halt or wind down nuclear testing in the Pacific.

In a strongly-worded speech in Canberra yesterday the French Ambassador warned that under no circumstances could testing stop in the foreseeable future.

The ambassador, Mr Jean-Bernard Merimee, said the credibility of France's nuclear deterrent program depended on the tests.

He said even if foreign scientists found unacceptable levels of radiation near Mururoa Atoll, testing would be unlikely to halt.

He added that if Australia and other South Pacific nations declared the area a nuclear-free zone, France would also ignore the move.

The French Government has invited Australian and New Zealand scientists to visit Mururoa Atoll to check on radiation levels and the safety of testing procedures.

New Zealand has agreed to take up the offer while the Federal Government has yet to decide.

The French offer came in response to the outcry over the latest series of tests, some of which are believed to have involved neutron weapons.

"France's nuclear deterrent depends on our credibility which is based on our technical progress," Mr Merimee said.

"That is why it is essential for our weapons to be kept up-to-date, which means a certain amount of testing.

"This is why we don't see in the foreseeable future any way of our tests being put to an end."

Mr Merimee, speaking at the National Press Club, said every precaution was being taken to see there was no harm to the environment.

For this reason, he said, France was taking the unprecedented step of allowing foreign scientists to view the atoll and the test procedures.

Asked after his speech whether testing would be stopped if the foreign scientists found danger to the Pacific region from the tests, Mr Merimee said that that "was going too far".

"If an Australian or New Zealand scientist finds there are some shortcomings in our measures which relate to radioactivity--and I don't think that will be the case--then it would be up to us to remedy this shortcoming.

"The level at which we invited the scientists is environmental only."

Asked why the tests were not held in France if they were safe, he said it was only a question of logistics.

"The tests are safe, but they do provoke small earth tremors which is why they are carried out by all nuclear nations in unpopulated areas.

"We selected Mururoa Atoll because it is perfectly isolated, it was perfectly uninhabited (though now it supports 3000 people) and it is French territory," Mr Merimee said.

New Australian Protest

Sydney THE AUSTRALIAN in English 1 Jul 83 p 2

[Text] FRANCE detonated a 50-kiloton nuclear device at Mururoa Atoll in the South Pacific yesterday.

The Federal Government has made a strong formal protest.

The explosion was the third this year, and brought to 34 the number of nuclear tests carried out underground since France launched the program in 1975.

A spokesman for the Foreign Affairs Department in Canberra said last night a formal protest had been sent to Paris after the blast.

"The Government's position has been clearly enunciated," he said. "Australia opposes all forms of nuclear testing."

Despite this, the French ambassador to Australia, Mr Jean-Bernard Merimee, said in Canberra yesterday that France had not set a timetable for ending the program.

He told the Australian Institute of International Affairs that the French nuclear deterrent had to be kept updated, and said: "I do not see in the foreseeable future a prospect of our testing being brought to an end."

Seismologists said the explosion, the equivalent of 50,000 tonnes of TNT, registered 5.6 on the Richter earthquake scale.

The largest recorded detonation was of 140 kilotons in July, 1979.

After the second atomic blast at the end of May - France's strongest in three years - the Foreign Minister, Mr Hayden, condemned the explosion, and Canberra's ambassador to France issued a formal protest to the French Government.

Mr Hayden then said: "If they're determined to test these things ... let them test the damn things in the Atlantic or the Mediterranean, or on mainland France, but let's keep them out of our backyard."

Confirmed

The French Government was also strongly criticised yesterday by the New Zealand Prime Minister, Mr Muldoon, who said: "We regret it, but we know they are continuing with their tests and we would expect them from time to time."

However, Mr Muldoon stood firm on his claim that the French President, Mr Mitterrand, had privately confirmed a date by which he expected the testing program to end permanently.

But Mr Merimee expressed surprise at Mr Muldoon's comment and said no timetable had been set.

Mururoa is a tiny atoll about 8000km east of the northern Australian coastline.

CSO: 5100/7538

SHIRE COUNCILS NOT FOR REJECTING NUCLEAR-FREE ZONE BILLS

Perth THE WEST AUSTRALIAN in English 30 Jun 83 News of the North p 1

[Article by Peter Trott and Peter Morony]

[Text]

COUNCILS for the Pilbara's two most populous shires, Roebourne and Port Hedland, have been accused of being out of touch with residents following their rejection of nuclear-free zone proposals.

Last Wednesday, the Roebourne Shire Council voted eight to two against declaring the shire a nuclear free zone.

The next day, the Port Hedland Shire Council voted five to three against a nuclear free zone. Two councillors abstained from voting.

After this meeting, Cr Lawrence Emery said the issue was too important to be decided then and there by the council. The matter should be open to public debate.

Cr Emery introduced the subject at the meeting after it had been deferred from a fortnight earlier.

He told the council that it should encourage public debate before making a decision but before he could frame a motion in this direction Cr Jack Haynes moved that the shire not be declared a nuclear-free zone.

He said nuclear-powered ships were already operating and there was potential for such ships to be used to carry iron ore from the Pilbara. To deny them access would be detrimental to the economy of the area.

"In a strategic sense it is all very well to declare the shire nuclear free, but our enemies will not be aware of that," he said.

"We are burying our heads in the sand."

Affiliation

Seconding the motion, Cr John Van Uden said the proposal that Port Hedland be declared a nuclear-free zone had come from the Australian Nuclear-Free Zones Secretariat. It included a request for a \$100 affiliation fee and an invitation to councils becoming affiliated to contribute further amounts for the running of the secretariat.

Cr Van Uden said that if it became affiliated, the council could find itself funding anti-nuclear protests.

Cr Emery said 56 local authorities had declared themselves nuclear-free zones and it was hoped that eventually the whole of Australia could be nuclear-free.

At the Roebourne Shire Council meeting, Cr Brian Barber said he was not in a position to make such a choice on behalf of ratepayers.

Moving for rejection of the nuclear free zone proposal he said: "I am not technically qualified or expert enough in all the facets of nuclear power to be able to speak on behalf of the shire's ratepayers."

He said there should be opportunity for the people to air their views but it was up to

the State and Federal Governments to acknowledge public opinion, not the council.

He also had reservations about the council aligning itself with a group such as the secretariat.

Surprise

After the meeting, Cr John Duncan said he was surprised that the motion had been framed in the negative.

"I was disappointed that it was taken in such a non-serious way," he said.

"There is a bit of possible concern that this area is the sort of place where they could build a nuclear reactor."

"Take the French, who use Muraroa atoll because it's a long way from home."

"If they built a reactor here there would only be a few whinging Nor'westers to worry about."

"It's now time when people should be considering where they should be going and not fobbing the issue off."

Cr Emery said this week that the matter of nuclear-powered ships was not relevant. Fremantle was a nuclear-free declared zone, but the local authority did not have control over the port.

In a wider sense it was important for a public consensus to be established because nuclear energy was one of the growing issues of the 1980s.

Already in Germany the Green Party had won up to eight per cent of the total vote.

"In Europe it is a big issue now," he said.

CSO: 5100/7538

LABOR CAUCUS SUPPORTS INTERIM HAWKE POLICY ON URANIUM

Melbourne THE AGE in English 29 Jun 83 p 3

[Article by Michelle Grattan]

[Text] CANBERRA. — Supporters of the Prime Minister, Mr Hawke, yesterday won an interim victory during a hard battle on uranium in Caucus's industry committee.

During the meeting Victorian Left-winger, Mr Lewis Kent, walked out, claiming some people there had "the mentality of drug peddlers".

The committee passed a motion, moved by a Hawke supporter, Senator Richardson (NSW) calling on the Government to approve no new contracts for the sale of uranium by the companies Energy Resources of Australia and Queensland Mines until the review of uranium policy now being conducted by Cabinet was completed.

It also endorsed an amendment by Mrs Kelly (ACT) which asked Cabinet to report back to the committee on the companies' rights to negotiate new contracts, in light of ALP policy.

But the Richardson motion and the Kelly amendment were passed only after a procedural wrangle which saw another motion, moved by Mr Kent and amended by Mr Cunningham (Vic) passed 14-8 and then recommitted after Senator Richardson protested the motions had been put in the wrong order.

Mr Kent claimed last night that Senator Richardson had "snowed" the committee chairman, Dr Tho-

nephous, who was "an academic not used to chairing meetings at which he is bullied".

Yesterday's "soft" industry committee resolution has left Mr Hawke in a strong position for today's meeting of the national executive, where uranium is also being discussed.

Last night a compromise was being worked out which executive sources said was likely to get through today's meeting.

Under the compromise, the executive would pass resolutions on relations with the Parliamentary party, uranium and Timor which:

- Upheld the authority of the conference on policy but also affirmed the rights of the Parliamentary party on the details of implementation.

- Called for substantial consultation between the Ministerial committee reviewing uranium policy, the Caucus committee and a party policy committee which is being set up today.

- Noted the new negotiations between the Indonesians and Fretilin and put off a statement on Timor policy until after the outcome of those is seen.

Yesterday's industry committee meeting was discussing the decision by the deputy Prime Minister and Minister for Trade, Mr Bowen, to approve licenses for ERA and Queensland Mines to negotiate new contracts.

Mr Kent's motion proposed banning new mines, cancelling the two special negotiating

licences and declaring that Queensland Mines should not be allowed to ship to France.

Mr Cunningham's amended version softened this slightly. It talked about "withdrawing" rather than cancelling the licences and — more important — it added a qualification which would exclude the rich proposed Roxby Downs in South Australia from the ban on the new mines. It also added the qualification that the ban on the sales to France was while France continued nuclear tests.

The uranium issue will come to full Caucus on 12 July when the committee reports. The pro-Hawke forces last night believed they could hold the line at that meeting too.

Two Left-wing Ministers, the Minister for Territories, Mr Uren and the Minister for Defence Support, Mr Howe, opposed Mr Bowen at yesterday's meeting.

- Western Australia's Australian Labor Party state executive has voted strongly against any changes in existing party policy on uranium. If followed means no new uranium mines, no more export licences and no more uranium contracts with France.

- An \$18 million pilot plant for the Roxby Downs uranium copper and precious metals project could be operating by the end of this year the South Australian Mines and Energy Minister, Mr Payne, said yesterday.

CSO: 5100/7538

PILOT PLANT SET FOR ROXBYS DOWNS URANIUM MINING SITE

Melbourne THE AGE in English 29 Jun 83 p 17

[Text]

The cost of the feasibility study on the Roxby Downs copper-uranium project have leapt to \$150 million and will include an \$18 million pilot plant to be built this year.

Western Mining Corp. and BP Australia spent \$50 million on the project ahead of last year's indenture agreement and agreed to spend an additional \$50 million on the feasibility study.

WMC's managing director, Mr Hugh Morgan, said last night more than \$80 million had already been outlaid and total expenditure on the project by the end of the feasibility study stage was now expected to reach \$150 million.

The South Australian Minister for Mines and Energy, Mr Payne, revealed yesterday that the SA Government had granted a licence to build the pilot metallurgical plant.

The \$18 million plant would operate for a year to determine the most satisfactory method of processing ore from the Olympic Dam project near Roxby Downs station.

Mr Morgan said the partners planned to have the pilot plant operating by the end of 1983 or early next year.

The partners have until the end of 1984 to complete their feasibility stage and Mr Morgan said it would be touch and go as to whether this was possible.

As presently conceived, the project would cost \$1400 million (in 1981 dollars) and would extract

65 million tonnes of ore a year. This would yield about 150,000 tonnes of copper, 3000 tonnes of uranium oxide, 110,000 ounces of gold and 23 tonnes of silver a year.

WMC has 51 per cent of the project and BP has 49 per cent. The joint-venture agreement calls for BP to fund the first \$50 million (in 1978 dollars) of work on the project and to cover WMC's share of costs for spending above that on the understanding that it will be repaid by WMC out of the project's cash flow once production begins.

Besides the pilot plant, the feasibility study will include the preparation of options for the mine and plant design, extensive drilling and more than a kilometre of underground driving from the exploratory shaft which has been sunk to a depth of 500 metres.

Construction of the pilot plant would involve a workforce of 90 and another 70 people would be employed to operate the plant, Mr Payne said.

He also disclosed that the Government had approved construction of a northern road corridor to the site of borefields which will supply water to the Olympic dam project.

The government last week approved an environmental impact statement on the project.

CSO: 5100/7539

AUSTRALIA

BRIEFS

SUPPORT 'NUCLEAR-FREE ZONE'--Australia is to ask the South Pacific Forum nations to agree to a ban on all nuclear testing, storage and dumping in the South Pacific. Radio Australia's Canberra correspondent, Ted Knez, says Australia is to formally call for such an agreement at the meeting of Forum nations in the national capital, Canberra, late next week. Our correspondent says the Australian Government has already given the Forum nations the details of its proposed nuclear-free zone in the South Pacific. While the Forum nations are not expected to declare such a zone, they will be called on to support the ban, specifically on the storage testing or manufacturing of nuclear weapons. Australia's proposal still allows the right of movement of nuclear-powered and armed shipping and aircraft throughout the South Pacific. [Text] [BK150922 Melbourne Overseas Service in English 0830 GMT 15 Aug 83]

KOONGARRA URANIUM MINE--Darwin.--Aboriginal traditional owners and Denison Australia Ltd have reached agreement in principle on an unprecedented joint venture for development of the controversial Koongarra uranium mine in the Northern Territory. This is despite moves by the Federal Minister for Aboriginal Affairs, Mr Holding, to persuade the traditional owners and the Northern Land Council to halt the negotiations until the Federal Government formulates a policy on the future of uranium mining. Denison's managing director, Mr Kevin Torpey said in Darwin on Friday that the Aborigines would take up 25 per cent equity in the \$150 million project upon ratification of the agreement. He said part Aboriginal ownership of the mine was included in a financial package covering the site. The announcement is expected to intensify a bitter three year struggle between the project developers, the NLC, and the traditional owner, Mr Mick Alderson, and three of his sisters over development of the mine, which is situated on a 12.5 square kilometre excision in the middle of the World Heritage-listed Kakadu National Park. [Text] [Sydney THE SYDNEY MORNING HERALD in English 27 Jun 83 p 17]

CSO: 5100/7539

SOUTH KOREA

BRIEFS

NUCLEAR SCIENTISTS TO FRANCE--Korea will send 20 nuclear scientists to France annually for training in nuclear energy, the Science-Technology Ministry said yesterday. A ministry official said the five-year education program to start in 1984 was initiated during the second Korea-Franco Joint Committee meeting on nuclear energy held here July 11. During the one-day meeting, the two countries also agreed to promote coöperation in nuclear energy, including the exchange of information on nuclear power plant and accidents, radioactive waste management, and joint study on the feasibility of fast breeder reactor, the official said. [Seoul THE KOREA HERALD in English 20 Jul 83 p 8]

CSO: 4100/200

CZECHOSLOVAKIA

DELAYS CONTINUE TO HAMPER NUCLEAR POWER PLANT CONSTRUCTION

Bratislava PRAVDA in Slovak 6 May 83 pp 1, 2

[Article by PRAVDA editor Dusan Stancek: "Steep Curves on the Scheduling Graph"; portions within slantlines in boldface]

[Text] /Jaslovske Bohunice—A look at the construction site of the V2 power station in Jaslovske Bohunice indicates normal work activity, although during these weeks the project was to present the appearance of a machine in full operation. Unfortunately, this is not merely an impression. Starting at the end of March the builders were to perform finishing work on 38 areas after equipment installation. But they have not received even one from the equipment installers. If not even this is a sufficient argument that an undesirable situation exists, it would suffice to look at the schedule for meeting the construction deadlines. Since the beginning of the year the curves have been falling sharply for the critical facilities, more or less paralleling previous delays; and gradually making them up still remains more a wish than a reality./

In a conversation with Eng Ivan Kubicek, a representative of the leading operational group from the construction plant of Elektraren Bohunice [Bohunice Electric Power Station] we obtained more detail on the general information given above. One of the most important problems of the project during this period was the laying and distribution of cable. The error occurred sometime in the past. The equipment planners did not coordinate their work with that of the construction machinery and electricity planners, so that today there is piping where there should be cable, and vice versa. Naturally, this produces excessive stress, and the organizations involved are exhausting themselves, especially the branches of Elektromontazne zavody [Electrical Installation Plants] Prague and Zavody priemysline automatizace [Industrial Automation Plants] Bratislava; teams of designers are expanding in Jaslovske Bohunice. This is now essential for the project, but if the work had been coordinated in advance these troubles could have been prevented.

It is constantly asserted at conferences and meetings of the representatives of party and operating offices and organizations that the construction of nuclear power installations is an undertaking of the entire society. The construction of the nuclear power stations at Jaslovske Bohunice and Dukovany has top social priority. But certain facts are at odds with these

words. Slovenske energetické strojárne [Slovak Power Production Works] Tlmace received an order to produce a corrosion-resistant facing for the spent fuel pond of the V-2 station. But the delivery deadline presented problems, and the mechanical engineers at Tlmace attempted to get it extended. They finally agreed with the purchaser because they were unwilling to be the cause of further delays. But it is worth noting that similar components are being produced for the Dukovany station by Kralovopolska strojárne [Kralovo Pole Mechanical Engineering Works] in Brno. /Surely it would have been more logical to have them all produced in the same engineering works rather than producing "duplicated" products, spending the time measuring material properties in both locations, and the like—not to mention the fact that giving priority to one type of production leads as a rule to missed deadlines in other deliveries. Thus, even in the ministries themselves there is clearly a need to find smoother routes./

Until recently a burning problem at the construction site was a sufficient supply of demineralized water, because there were delays in the construction of the "water circuit," which includes a water-treatment facility. The problem ceased to be acute when the pipes and equipment were flushed with water from the V-1 station. But this water has to be purified once more before it can be used in the primary circuit, and therefore the workers of CKD [Ceskomoravska-Kolben-Danek] Dukla, Elektromontazne zavody Prague and Zavody priemyslne automatizace, among others, will have quite a job putting some of the equipment of the chemical water-treatment facility into operation by 20 May of this year. The investors believe that they are in a position to master the task.

Post installation and cleanup operations in the auxiliary systems of the primary circuit are also aiming at the same deadline. Here the installers from Kralovopolska strojárne Brno and the personnel of the Sigma concern enterprises have the key role. Any delay in these operations (but not only in them) will put the insulators, from Termostav in Bratislava, in difficulties, because they will have little time for their work.

/Another bottleneck in construction is completion of the installation of the diesel generator station. Unfortunately it is already behind schedule, and the supplier, CKD Hradec Kralove, is having problems with foreign installers, according to what we were told by Zdenek Brestovsky, a representative of the installation office. But surely work can still be done to assure that the enterprise will not go on record as having missed the deadline./

Eng Ernest Jancina, director of the Hydrostav plant in Jaslovska Bohunice, still does not consider the complex situation to be a hopeless one for the builders. They still have to build many access roads and replace temporary installations with the permanent ones. They are having trouble getting the necessary areas freed up, and the fact that they have not yet been provided with areas for finishing construction work is weighing on them. "A huge amount of construction work is piling up, and we had not planned on that. We will relieve the pressure by working in three shifts, and sometimes on days off. But the problem is that the interior parts of the installations

are full of epoxy vapors from the paints, which will slow down the welding work," Jancina states.

The CPSL project committee regularly discusses problems in the construction project. At its last April meeting, in which the principal installation offices participated, it criticized the inadequate coordination of the performance plans and also discussed cleanliness and order on site. "A few days ago, the CPSL project committee wrote to representatives of the main party organizations in the enterprises doing the finalizing work. We are concerned with speeding up installation work so as to provide sufficient room for the Termostav personnel," said the committee chairman, Anton Srdos.

The current state of startup and adjustment work on the systems imposes particular demands on flexible management, although it had not been expected that there would be a requirement for a short-term increase in the number of workers of the construction organizations and installation enterprises. "We face many problems, but we must not lose a realistic view of the situation; we must strive to meet the deadlines," emphasizes Eng Milan Kozak, director of Elektraren Bohunice, who is also leading the operational group for project management.

/In spite of the complex problems which arise every day onsite, the builders must rely not on help from outside, from the central organs, but primarily on their own efforts and initiative; they must pave the way for each other's work, as they promised to do in their joint socialist pledge./

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CSO: 5100/3027

CZECHOSLOVAKIA

NUCLEAR POWER PLANT SITE SELECTION IN CSSR DISCUSSED

Prague RUDE PRAVO in Czech 26 May 83 p 5

[Article by Eng Ladislav Namestek, Czechoslovak Atomic Energy Commission:
"Sites for Nuclear Power Stations"]

[Text] Our nuclear power program does not end with the construction of the stations at Jaslovske Bohunice, Dukovany, Mochovce and Temelin. Thus the question arises where future stations will be located. Related to it is another question: why the ones which are or will be under construction are being built in those locations, and what criteria we use to select the sites.

All nuclear power stations being built are close to a main power line; their location is dictated by the necessity of decreasing the losses involved in transmission of electric power from the stations and by the fact that Czechoslovakia has insufficient energy. But the future will bring another problem, the necessity of supplying heat to large areas. This problem is to be solved by nuclear electric power stations from which heat is withdrawn or be specialized nuclear power and heat stations. Accordingly, further progress in developing nuclear power production involving use of power stations for heating will focus on central Bohemia to supply Prague, on eastern Bohemia with the Hradec Kralove-Pardubice cluster, on northern Moravia with the Olomouc and Ostrava areas, and finally in eastern Slovakia with the Kosice and Presov areas. Nuclear heat-production stations will be sources of heat for Bratislava, Plzen, Usti, Liberec, Gottwaldov, Zilina, Banska Bystrica and Humenne.

Dozens of Conditions

This answer casts light on the basic concern in siting nuclear power stations, which stems from power production needs and from the priorities of our energy strategy. It determines the area in which, during further preparations for construction of nuclear power stations, it will be necessary to start by selecting several alternative sites, evaluating them in comprehensive fashion and giving priority to the site which is suitable from all points of view, or which at least is as close as possible to an ideal site. Also important is the question of expenditures on production and future operation and on measures needed to compensate certain negative features of the site. Not only site selection, but also possible changes in the design of the structures and

equipment, must prevent any disruption of future operations by other industrial activity. This prevents possible breakdowns or loss of function of sensitive structures in the power station.

In this context, the most important point is the probability of occurrence of earthquakes of a given intensity which might cause damage to process or control equipment. Accordingly, all areas where the intensity of earthquakes has exceeded prescriptions and norms based on the level which a power station should be able to withstand are completely ruled out. Danger posed by landslides is handled similarly. Another bar to site selection is the possibility of inundation during floods.

Industry Hampers Matters

Increasing importance is being accorded to the results of industrial and other activity in the area around the selected site. The site is chosen at a sufficient distance from airports, usual flight paths, and areas of heavy air traffic. Sites with industrial activity, with toxic or stifling emissions, raw materials or products, particularly gases, and also sites for the production, storage or large-scale transport and use of explosives and combustibles, including the routes of oil and gas pipelines, are excluded or significantly limited. Although the facilities are constructed to withstand increased temperatures and pressures, the future power stations are protected by being built at great distances from these industrial facilities.

Also involved in the selection of a site is the possibility of building normal transport routes, particularly rail lines, for material and operating media, but also pipelines for cooling, process and drinking water, electric power lines, and routes for transport of construction personnel and future operating personnel.

Safety for the Inhabitants

Site selection should assure that the effect of operations on people is minimized. Proof that the [radiation] doses received by individual inhabitants and the total of these doses for the entire population (i.e., the collective dose) in the vicinity of the future station will be minimal must be presented during the selection of the site, based on planning data on the composition of gas and liquid wastes to be released. Results to date indicate that there is a 10,000-fold margin relative to the public health requirements. In addition it is required that the site which is selected guarantee considerable dispersion of emissions in the air. Valleys with little wind movement and the like are excluded. In addition, for this purpose the area around the selected site must provide space for a protective belt with no permanent inhabitants. Sources of drinking water and spas are protected against the combined effects of gaseous and liquid wastes, which include chemicals and petroleum residues; power stations cannot be sited in the vicinity of such sources. Areas which have been declared or proposed as national parks, state natural reservations, protected border areas, mineral finds, works of nature, and areas extensively used for

recreation or travel are excluded in advance. The site must also meet the important condition of minimizing the amount of agricultural land taken. This also applies for areas containing the routes of national railroads, highways, water routes, telecommunications routes, and locations with radio and television transmitters.

In selecting a site, it is also necessary to take account of the development of agricultural production in the vicinity and the method of supplying the inhabitants with food and drinking water.

All of the above-mentioned considerations for selection of sites for nuclear power stations constitute a set of criteria. In spite of their use, it is extremely difficult to make a comprehensive evaluation of a possible site in a given area. The results of investigations based on binding expert views and the opinions of many organizations and institutes are seldom so unambiguous that they single out one site with all the optimal properties. All sites have certain negative features.

This is why the selection of future sites is such a complex undertaking. Nonetheless, it must be done sufficiently in advance of construction work and in such a manner that the power station will serve society without harmful effects.

8480
CSO: 5100/3032

POLAND

NUCLEAR PHYSICS, ENERGY DEVELOPMENT OUTLINED

New Atomics Model

Warsaw SLOWO POWSZECHNE in Polish 3-5 Jun 83 pp 3, 4

[Interview with Dr Mieczyslaw Sowinski, State Atomic Agency president, by Michal Maliszewski: "Polish Model of Atomics; Controlled Reaction"]

[Text] Without the contribution of nuclear energy it would be difficult for one to visualize meeting the growing needs for electrical energy. This is also why we attach great importance to the construction of the first Polish nuclear power plant. An expression of deep insight into the future are the structural changes in the scientific-experimental facilities and the rise of such units as the Institute of Atomic Energy as an example. The development and application of the new model of Polish atomics is being conducted by the State Atomic Agency now in existence slightly more than a year.

[Question] Mr President, your participation in the management of atomics is not novel to you, for as I recall, you were vice president of the Atomic Energy Commission. Do you think that the specificity of that field requires administration by a designated central body?

[Answer] Obviously there can be various solutions, however, practice has revealed that in practically all developed countries independent units of the National Administration occupy themselves with this. In Poland, from 1957-1973, this function was carried out by the Office of Government Plenipotentiary, which in 1974-1975 was replaced by the Atomic Energy Commission already mentioned here. Following the creation of the Ministry of Nuclear and Atomic Energy in 1976, the atomics department was managed by one of the undersecretaries of state in that ministry and two selected departments; in time this problem was limited in scope to the work of only one department.

In the meantime, atomics is a field in which perhaps more so than any other, continuity and stability of management are necessary, especially in the area of supervision.

[Question] The State Atomic Agency came into existence on 27 February 1982. Subject to our agency are three institutes that had arisen as a result of the formation of the Nuclear Research Institute in Swierk, namely: Atomic Energy Institute; Institute for Nuclear Problems; Institute of Chemistry and Nuclear Technology and also the Institute of Nuclear Physics in Krakow; the Central Laboratory for Radiological Safety and the Polon United Nuclear Equipment Plants.

[Answer] Thus, the agency concentrates on scientific-research problems, as well as production of radioactive materials, equipment and nuclear apparatus. Likewise, included in our sphere of activity, are problems related to radiological protection and nuclear safety and control of the use of nuclear equipment.

[Question] As usual there are two schools: one maintains that nuclear technology is completely safe; the other--the contrary, that it is not. Consequently, how does this appear from a standpoint of nuclear equipment control?

[Answer] Nuclear technology, since it is already controlled at this time, appears to be even simple and uncomplicated, provided that rigorous rules regarding radiological protection and nuclear safety are observed in its disposition. Great satisfaction is derived from the fact that during the course of 27 years of operating various equipment, we have not had in Poland, except for minor incidents, any serious accidents. This is the accomplishment of the institution and the employees utilizing nuclear technology, as well as the Central Laboratory for Radiological Protection. For many, the fact that something functions well serves as a tranquilizer and they awaken only after an accident. The matter is treated differently by the Central Laboratory for Radiological Safety [CLOR] which is ever vigilant, and tranquility in this sphere is the result of its long-term and manifold efforts.

As a result of this activity, the only source of radioactive atmospheric pollution in our country is worldwide radioactive fallout, constantly decreasing after all, since 1963. This means that we ourselves do not contribute to this pollution. This is the result of technology, discipline and strict control. And after all in the health service, chemistry, mining, energy and many other sectors of the national economy, several tens of thousands of nuclear devices and appliances are at work. We also possess several thousand fire-fighting signal isotope sensors which were installed in industrial plants, hospitals, and also in such centers as the National Museum in Krakow and the Royal Palace in Warsaw.

[Question] In the entire economy, and particularly in its scientific-technological facilities, one can observe a profound underinvestment in equipment. How does the situation appear in units subject to the State Atomic Agency [PAA]?

[Answer] Many of our facilities are operated to the limit and require fundamental modernization, at least the reactor Ewa, which is regarded by many as an experimental reactor that presently satisfies over 50 percent of the national need for isotopes from current production, and it has already been in operation for 25 years. At the Krakow Institute of Nuclear Physics, the modernization of the cyclotron is long overdue, and the reactor Maria, built through the

personal efforts of our scientists and engineers, is lacking in elementary equipment. Anyway, except for the reactor Maria referred to, atomics has not implemented any more outstanding investments in the 1970's. It did not receive any credits and except for one, it has not purchased a license.

The present time, as we know, is not favorable for investments, but in the meantime, the Polon plants could--technological conditions permitting--produce several times more blocks of the CAMAC electronic system than they are presently producing, and this is our export breakthrough. This year Polon United Plants began the production of steering systems for nuclear power plants which are wholly designated for export to Council for Mutual Economic Aid [RWPG] countries and in the near future will also serve our atomic power plants. The technological and qualitative level achieved by Polon production contributed in an essential manner to our country's attainment of specialization in the sphere of producing those devices representing the complex production of nuclear technology.

[Question] As I understand it, PAA is seriously engaged in the birth of Polish nuclear energy?

[Answer] Being guided by the urgency of assuring an adequate increase in electrical energy after 1990, the cabinet adopted a resolution to build the first Polish nuclear power plant. There has been so much said and written about the power plant in Zarnowiec that any comment will only be repetition. Aside from the steering system already mentioned, the PAA will assume the work in every phase of the investment process. We shall be guided here by well-informed public interest.

In view of the existing questions and doubts, we do not intend to conceal that a nuclear power plant could be dangerous to the environment, just as a box of matches is dangerous in the hands of a 2-year-old child. But the problems of safety are technologically and technically under control. Danger can occur here only in the event of damage, whereas for example, a power plant fueled by coal constitutes a permanent threat to the surrounding community. Anyway the few instances of damage that occurred in nuclear power plants, and there are approximately 280 of them in operation in the world and another 200 under construction, could be attributed to human error and not technological causes, and resulted chiefly from gaps in the training of personnel. Therefore, notwithstanding the relatively long interval before our power plant is activated, already today much preparatory work is in progress. It includes also the training of personnel. This will be served by the construction of an experimental nuclear power plant model station that will be located either in Swierk or at the Gdansk Institute of Technology.

We will likewise benefit from the experience of countries advanced in the construction and operation of nuclear power plants. Nor will our own experience be meaningless, although obtained in the area of radiological protection during the course of many years by the Central Laboratory of Radiological Safety, which in time should be changed to Inspectorate of Nuclear Safety and Radiological Protection.

[Question] After more than a year's existence, the internal organizational work in the agency should surely be regarded as completed; what consequently in your opinion is essential in the present phase of development?

[Answer] The State Atomic Agency assumed many tasks, whose common goal was the implementation of statutory resolutions of the Sejm that called it into being. Presently, deserving special emphasis is the fact of considerably advanced work on a draft of a statute on atomic law and the decrees accompanying it.

The statute will be the first comprehensively-conceived legal act of that rank in our country. The situation engendered the decision for this type of legal regulation of problems connected with the use of nuclear energy. The statute will fulfill an increasingly sensitive gap in that field. It encompasses the whole of such problems as the acquisition and use of nuclear materials, localizing and planning, construction and operation, as well as liquidation of nuclear facilities. It will also standardize the issue of neutralizing radioactive fallout, and a series of other problems essential to atomic functioning in the economic life of the country, defining them not only from a technological but also an officially legal standpoint.

Nuclear Physics Research, Application

Krakow DZIENNIK POLSKI in Polish 20-22 May 83 p 4

[Interview with Dr Andrzej Budzanowski, professor and assistant director at the Institute of Nuclear Physics in Krakow by Wojciech Tatarczuk: "Workshop of Krakow Scholars; Nuclear Physics Without Mysteries"]

[Text] In the 1950's a surprising occurrence to say the least, was the great frequency which the university lectures of Prof Henryk Niewodniczanski enjoyed. To be sure no one thought of questioning the scientific contributions of the scholar, whose master was the discoverer of the atomic nucleus, a physicist of worldwide renown, Nobel Prize winner Lord Rutherford of Nelson; but surely you the readers must admit that to speak in an intelligible manner, add interesting to that, about nuclear physics is exceedingly difficult. Therefore, I was also curious to meet with the pupil and one of Niewodniczanski's successors--Dr Andrzej Budzanowski, assistant director of the Krakow Institute of Nuclear Physics.

My interest in physics--Professor Budzanowski related--obviously began with my university studies. My master's thesis dealt with specific nuclear reactions, and since the cyclotron was activated almost simultaneously in Bronowice, I benefited from that basic research tool. The cyclotron, constructed in 1958, with a diameter of 120 cm pole shoes supplies alpha molecule beams of energy ranging from 23-29 Mev and deuterons ranging from 11-13 Mev. Well, in the year of activation, it was a cyclotron of average size on a modest European scale. Today it is a very obsolete device and

researchers can perform work with it from cognitive fields in a very limited area only. Without belaboring the point, I wish to state the usefulness of the "old" cyclotron in practical application....

[Question] Does this refer to scientists or does it also have a broader range of application?

[Answer] Above all research, although it must be stressed that during 3 months of the year--which is the best period of time for work of this type--the cyclotron is used for medicinal purposes. Tumors resistant to gamma and x-radiation are irradiated with it. This endeavor is accomplished with the aid of fast neutrons. In order to particularly avoid boring the readers, I will say only that the deuteron stripping reaction was utilized here. Beams of fast neutrons arising in its aftermath selectively strongly damage tissue with low oxygen content. Because they are precisely characteristic tissues for tumors with greater resistance to conventional methods of radiotherapy; it is, therefore, necessary for healing purposes to use a beam of quick neutrons, in our case with energy approximately 6 Mev. It is necessary to add that the Krakow facility which is occupied with the general application of nuclear radioactivity has been in operation for almost 27 years, and in the matter of irradiation with beams of neutrons, it is one of the few centers of this type in the world.

[Question] However, let us return to your basic work, which is cognitive research in the field of nuclear physics....

[Answer] In the 1960's, together with Prof Adam Strzalkowski and Prof Kazimierz Grotowski, we recognized and experimentally detected the effect of glory in nuclear diffusions, popularly referred to as the Brocken effect in nuclear physics. This effect known in meteorology was initially observed from the Brocken summit in the Hartz mountains. And so, let us visualize a man standing on top of a hill. If by chance the peak is above the clouds and the sun is at his back, he will then observe his own shadow on the clouds. If closer interest was devoted to this shadow, it would be noticed that the shadow is surrounded by a colorful aureole--this is the result of reverse diffusion of light into drops of water. This effect must not be confused with the rainbow.

In 1964, while analyzing the phenomenon of diffusing alpha molecules on nuclei of lime, we noticed a similar phenomenon in our center, at that time in the sphere of nuclear physics. I would like to add here that the basis of nuclear research on the glory effect became the beginning of a new wave, perhaps even more--participation in nuclear physics research. Thus not only were the Krakowians the first to discover this phenomenon but then also became creators of a concept that has been entered into the annals of the history of science. Mention can even be made of the rise of a whole research direction already numbering hundreds of jobs today.

[Question] The phenomenon of reverse diffusion is, therefore, associated with your name in nuclear physics. Were there also other innovative achievements?

[Answer] Because I have already mentioned that the Krakow cyclotron can solve only a limited number of subjects, I have, therefore, accepted an invitation to the Center for Nuclear Research in Julich in West Germany where I studied nuclear reaction with the aid of considerably greater equipment. And here also I was in luck--I discovered a new type of nuclear reaction, presently known under the name of missile absorption fragmentation (we could compare this for example, with the discovery of a new type of reaction in chemistry, or even the mechanism of antibody disintegration in immunology). In short, it could be stated that a new type of reaction depends on the fact that upon colliding with the nucleus of a heavy atom, the molecule alpha breaks up into two fragments, one of which reacts with a nucleus of the shield, and the other moves on further with the speed of a bullet. In further developing this research and transferring certain concepts to the physics of heavy ion collisions, we can to some extent indirectly observe other properties--such as the friction factor in nuclear matter, resistance to separation, etc.

[Question] And what are you working on at present?

[Answer] If we observe a glass full of liquid, water for example, which is heated gradually, we then observe that after a while the heat moves to another place. We can study this in the function of time--after several seconds the temperature will rise to the assigned degree. Until now within the confines of such a small block of matter such as the nucleus, it was observed that heat radiates in nuclear matter in a matter of 10.22 seconds. Finding a solution to this problem fascinates me today.

[Question] It is now timely to turn to the second function which you perform at the institute, that is the supervision of applications of nuclear physics methods to industrial problems, and the export of equipment and "technological ideas" not only from the institute into the country but also abroad.

[Answer] This is a thankful role; on the other hand, its honest utilization at the same time makes easier for me the fact that I myself work in the field of basic research, thanks to which I do not operate through any lobby in the selection of the best subjects which merit popularization. Here I must point out that the road from the ideas of a nuclear physics researcher to industry is repeatedly so muddled and remote that it is not always perceived. This stems not only from general Polish organizational confusion in the framework of initiating scientific-technological progress, but likewise from the fact that at the instant of discovering a phenomenon--most frequently this is work from the level of so-called basic research no one knows for what purpose it can be later used.

An example, the first from the edge. The phenomenon of neutron diffusion has been known for practically 50 years. Thirty years ago its use was proposed in the measurement of the contents of water. But only recently technological conditions arose making possible the construction of a neutron coke moisture gage to resist difficult conditions (shock, temperature, pollution) which are prevalent in connection with great ovens. To this time matters in the selection of other adequate parameters in the blast furnace process which were dependent on water moisture in coke were achieved with the aid of either imported devices or an approximation. Today, thanks to our cooperation with

Lenin Iron and Steel Works [HIL], all blast furnaces in Poland are gradually being equipped with neutron hygrometers of our own construction which are installed into the automatic blast furnace system. It is noteworthy that the original outlay of approximately 300 dollars which was required in the construction of one hygrometer was reduced to practically zero, thanks to the development of domestic production electronic semiconductor elements.

Even more encouraging is the export of equipment to countries representing a higher level in nuclear physics than does Poland. We ourselves designed and produced among others, dissipation chambers now in operation at the United Institute of Nuclear Research in Dubna [USSR] and at the Lawrence Berkeley Laboratory [U.S.]. Our chambers proportionally work with success in the largest European Center for Nuclear Research [CERN] near Geneva. We have captured the difficult markets of Western countries, selling licenses for the production of thermoluminescent materials to Sweden, and microwelders to West Germany and the United States. We also produce spectrometers for beta and neutron molecules.

[Question] We began with a profile of Professor Niewodniczanski as a precursor of the Krakow nuclear physics school. Today your research can be added to it. And therefore, a continuation of the tradition?

[Answer] We are a strong scientific center which is confirmed by research grant invitations to our employees, as well as by the level and extent of our printed works. However, I would like to state that as Professor Niewodniczanski was registered in the annals of physics with his experimental verification of the existence of magnetic dipole radiation, so today Prof Janusz Wilczynski, an alumnus of our institute, is numbered among the most respected world authorities in the field of nuclear reaction research induced by heavy ions, and who during his stay at the United Institute of Nuclear Research in Dubna succeeded in discovering the process of intense nonelastic diffusion, which is at least as significant as the work of Professor Niewodniczanski.

Nuclear Power Plants Construction

Warsaw RZECZPOSPOLITA in Polish 8-9 Jan 83 pp 1, 2

[Article by AMS: "After Decision of Government Presidium; First Poles on Construction Site of Gas Pipeline; Energopol Assists in Erection of Three Atomic Electrical Plants in USSR"]

[Excerpt] The first contingents of our specialists joined in the initial work on Soviet Union territory near the Czechoslovak border. We are to lay a section of the longest transcontinental gas pipeline in the world there, Urengoi--Uzgorod--as was related to the reporter by Jozef Sapula, assistant general director of the enterprise Energopol. As is known, this gas pipeline will supply gas from Western Siberia to consumers in Western Germany, France and other nations of western Europe. Poland's direct participation in the implementation of the gigantic investment traversing almost half of USSR territory is the result of recent decisions by the national Presidium of the Polish People's Republic [PRL].

The participation of Energopol and construction-maintenance enterprises related to it, in the implementation of new facilities for the USSR gas industry will assure Poland of additional supplies of natural gas.

Entrusting us with a section of the Siberia-Europe pipeline is not an act of chance. It is the result of a decision that the Polish contractors reached in the National Council. In 1975-1980 they installed the third section of the Sojuz gas pipeline south of Kharkov extending 583 km, four compressor stations for compressing gas, and other structures.

Implementation of the oil industry facilities in the USSR likewise became a large-scale Polish enterprise. The first phase of work for that subsector of the Soviet economy is behind us, and the second we shall complete in the current year--states Dr Jozef Sapula. Altogether we have already completed 742 km of large diameter piping in the Bialorus, Lithuanian, Latvian and USSR regions. Besides that, Energopol built 12 pumping stations on the pipeline route, crude oil check points and a series of other facilities.

Besides that, Energopol erected seven compressor stations in the area of Saratov on the pipeline route Pietrowsk-Nowopskov, as well as Szebielinski--Izmail. In Komarna near Lwow it also completed a compression for the compression of gas for Poland.

On the strength of an understanding between the Polish Government and the Soviet Union concluded in 1978, Energopol participates in the erection of three Soviet nuclear power plants: Khmelnitsky, Kursk and Smolensk. In exchange we will annually receive from the USSR 1.2 billion kilowatt hours in 1984 to 6 billion kilowatt hours of electrical energy in 1988-2003.

Altogether there are more than 6,000 Polish specialists employed on the Energopol construction sites in the USSR.

9951
CSO: 5100/3029

ARGENTINA

BRIEFS

HEAVY ION ACCELERATOR ASSEMBLED--Buenos Aires, 28 Jul (DYN)--It was reported that Argentina has concluded the assembly of a Tandar type electrostatic accelerator of heavy ions. The accelerator is the only one of its type and it is the most advanced one in the southern hemisphere. [Summary] [Buenos Aires DYN in Spanish 1525 GMT 28 Jul '83]

CSO: 5100/2084

INDIA

GANDHI RULES OUT HEAVY WATER IMPORT FOR N-PLANTS

Madras THE HINDU in English 28 Jul 83 p 6

[Text] New Delhi, 27 Jul.--The Prime Minister, Mrs. Indira Gandhi, today ruled out import of heavy water for nuclear power plants, including the Madras Atomic Power Plant.

In a written answer in the Lok Sabha she added that the Government's intention was to commission all the planned pressurised heavy water reactor units with indigenously produced heavy water.

In another answer the Minister of State for Science and Technology, Mr. Shivraj Patil, said the setting up of another heavy water plant of 110-tonne capacity, based on ammonia-hydrogen exchange process, was under consideration. This would be in addition to the two new plants being set up at Thal-Vaishet in Maharashtra and Manuguru in Andhra Pradesh.

Mr Patil said the snags in the existing heavy water production plants were not due to any "technological inadequacy." India's nuclear power generation capacity would touch 2035 MW with the commissioning of the two units of the Narora project and the first unit of Kakrapara by 1990.

When all the planned units become operational by the turn of the century, the capacity would reach 10,000 MW.

Soviet offer: The Soviet Union has offered assistance to India in the construction of 440 MW atomic reactors. The Government has so far evaluated some technical aspects of the offer.

CSO: 5100/7139

ANALYST REPORTS ON PROBLEM OF TARAPUR SPARES

Madras THE HINDU in English 21 Jul 83 p 1

[Article by G.K. Reddy]

[Text] New Delhi, 20 Jul--The Government of India is not unduly concerned over reports from Washington of mounting opposition from some sections of the American press, congressional lobbies and environmentalists to the proposed presidential waiver for the supply of a few critically needed spare parts for Tarapur that are not available elsewhere.

It expects the Reagan Administration to honour the promises given by the U.S. Secretary of State, Mr. George Shultz, in the course of his private talks with the Prime Minister, Mrs. Indira Gandhi, on this subject during his recent visit to Delhi.

Bonn's Offer

The German technical team that visited Tarapur has gone back after a two-week stay in India with full particulars of the Indian requirements. A list of spares that can be supplied by West Germany will be furnished soon so that India can start looking for other items elsewhere in order to narrow down the few generic parts that can be obtained only from the U.S.

An Italian team is expected shortly for discussions with Indian experts to identify the spare parts that can be provided by Italy, in addition to what West Germany is able to offer from its stocks or make under licence.

The U.S. has told India that in the opinion of its experts there is no need to replace the whole water recirculation pump system, since it should be possible to set it right without taking out the highly radioactive core of the reactor which would pose problems of storage. The General Electric engineers are said to be quite confident of handling the job with a minimal replacement of the damaged parts.

The Indian experts, on the other hand, want not merely an overhaul with a partial replacement of the water recirculation pump of one of the two Tarapur reactors, but a totally new unit that can be depended upon to perform well during the rest of the plant's life. But the Government is not prepared to

face the problem of storage that would raise the question of reprocessing at least some of the spent fuel that has piled up over the years of Tarapur.

Reprocessing Issue

The American strategy is to bypass the reprocessing issue and deal only with the question of spares at present. The German and Italian supply of spares, on the basis of agreements like the one signed with France, will also seek to leave the reprocessing issue in abeyance by maintaining that these parts were being provided under the 1963 Indo-U.S. agreement which itself is being interpreted differently by the two signatories on this crucial point.

It will take another two or three months to complete the necessary formalities for the commencement of the supply of the items that West Germany and Italy are able to provide in the near future. But how long the U.S. will take to go through its time-consuming procedures is anybody's guess, although India has been assured that it should not take too long, since the White House is already in touch with the leaders of the congressional committees concerned.

CSO: 5100/7136

MINISTER REPORTS NUCLEAR UNITS WITHIN SAFE LIMITS

New Delhi PATRIOT in English 26 Jul 83 p 7

[Text] India's power plants were working within safe limits and there was no truth in the recent reports that the Tarapur plant at Bombay had a radiation level above the safe limits. Union Minister of State for Atomic Energy Shivraj Patil informed the Rajya Sabha on Monday--the opening day of the monsoon session of Parliament.

Mr Patil was making a statement on a calling attention motion tabled by BJP leader Bhai Mahavir and two other members, who had sought the Government's statement over reported radiation leaks at the Tarapur Atomic Power Station, and the poor performance of the Rajasthan Atomic Power Plant and the steps taken by the Government in this regard.

Opening the discussion, Dr Mahavir said several scientists and workers were alleged to have suffered from an overdose of the radiation level.

He wanted an independent inquiry ordered into the working of the Tarapur plant and a white paper on the subject.

Mr Patil assured the House that the Tarapur plant was working within the safe limits and there was no danger posed to those working in or around it or to the surrounding fauna and flora.

Recommendations of the International Commission on Radiological Protection (ICR) were implemented in all atomic power stations in the country, including those of Tarapur and Rajasthan atomic plants, he said.

The Tarapur station comprising two units of 210 MW each had been supplying power over the last 13 years in a safe, reliable and economic manner, and all power stations were required to control the radiation exposure to personnel and also release of radio-activity to the environment, he added.

The Minister informed the House that the Rajasthan atomic power station had suffered from turbine blade failures, equipment problems, labour unrest and fluctuations in the grid system. "Steps are being taken to rectify all these deficiencies," he added.

Mr Patil said the radiation dose of all workers in the atomic plant was monitored constantly and a complete record was kept of such exposures. All workers employed in the power station engaged in radiation work were subjected to annual medical check-ups, add agencies.

Mr Patil said radiation protection has been provided to plant personnel and the public from exposures arising out of operation of these nuclear stations under a variety of rules adopted as per the recommendations of the ICR.

CSO: 5100/7138

SETHNA PRESENT AS KALPAKKAM REACTOR GOES CRITICAL

Madras THE HINDU in English 3 Jul 83 p 1

[Text] MADRAS, July 2--The first 235 MW unit of the country's third nuclear power station at Kalpakkam went critical at 8-41 tonight. As things moved smoothly for the Candu-type, pressurised heavy water reactor--which has over the past several weeks gone through a battery of exacting, statutory tests to establish reliability and safety--a new milestone was reached in the indigenisation of the nation's nuclear programme.

"India joins the select band of countries which have established their capability for designing, building and commissioning nuclear power stations on their own," said the Department of Atomic Energy. (The other countries are the U.S., the U.S.S.R., U.K., France, Sweden, West Germany and Japan).

Scenes of jubilation marked the event, which for many of the staff at the plant was the culmination of almost 17 years of persistent endeavour.

Mr. H. N. Sethna, Chairman of the Atomic Energy Commission, who was among those present on the occasion, thanked all the personnel for bringing MAPP-1 to criticality and said "we must now proceed to put the station on line and I am sure you will continue in a dedicated manner to see that the station operates safely, efficiently and economically". He also informed the Prime Minister about the achievement of Kalpakkam.

Power by Month-End

The station is likely to begin generating power by the end of the month after more rounds of tests and checks are carried out on the systems and stabilised commercial power generation is likely to be established a month or two later.

Active preparations for this vital phase of the project were apace for several weeks now. Bundles of natural uranium, the fuel, were loaded into some 306 channels within a giant calandria. More than 200 tonnes of heavy water, the non-availability of which had delayed the commissioning of the plant for months, duly arrived last month, all of it produced indigenously. This was stored in a dump tank located just beneath the calandria.

Today heavy water was pumped up gradually into the calandria, the nuclear chain reaction was facilitated and when the chain reaction became self-sustaining at a constant level the reactor attained criticality.

"Big Step"

Asked about the significance of Kalpakkam having attained this phase of development, Mr. Sethna said, "It is the first Indian designed, Indian engineered and Indian built nuclear power plant. It is a big step."

Tracing the history of the project, Mr. Sethna said that the real construction work started in 1971 but after the peaceful nuclear explosion in May 1974, exports of nuclear equipment to India were stopped. "We had to do a complete redesigning job and to get people qualified for this work required tremendous inputs." It took us two and a half years to do this redesigning and refitting, he said.

New Safety Features

Mr. Sethna pointed out that following the accident at the Three Mile Island nuclear plant in the United States, many new safety features were built into the Kalpakkam plant. "Then we had to accumulate enough heavy water. These were the major milestones for Kalpakkam," he said.

The Safety Review Committee of the Atomic Energy Commission, a body set up to regulate all the safety aspects of the Indian nuclear programme was at hand to monitor the behaviour of the reactor as it progressed toward criticality.

Among others at the plant site today were Mr. M. R. Srinivasan, Director, Power Projects Engineering Division, Atomic Energy Commission, Mr. M. H. P. Rao, Project Director, Madras Atomic Power Project, and Mr. B. Vijayaraghavan, Chairman of the Tamil Nadu Electricity Board, which is to get all the power produced by the first unit.

Although the unit is rated to generate a maximum of 235 MW plant officials were hopeful today that they would be able to produce around 180 MW by the time power begins to flow into Tamil Nadu's power network, an event that is now being slated for early August.

When it does materialise, it will be an unexpected bonus for this power-short State. The 180 MW of power may not be very much more than half of what Madras uses, but it could be exactly the additional power the TNEB will need in August to bring about equilibrium between the supply and demand. The TNEB has estimated that the demand for power during the month could be as high as 2000 MW. But when it worked out its generating capacity for the next 12 months recently it reckoned without the entry of Kalpakkam and had projected a deficit of about 200 MW.

The summer deficit, however, is expected to be larger, around 500 MW, and although Kalpakkam may not help to prevent power cuts altogether, it will, by

helping the TNEB reduce the overall power deficit for the year from 25 per cent to 15 per cent, spell a lighter restriction for the State's consumers.

The second 235 MW unit at the station is scheduled to be commissioned in December 1984.

CSO: 5100/7131

SETHNA RULES OUT EARLY BUILDING OF URANIUM PLANT

New Delhi PATRIOT in English 11 Jul 83 p 7

[Text] Atomic Energy Commission chairman H N Sethna has ruled out the possibility of India's setting up a uranium enrichment plant in the near future, reports UNI.

In a Doordarshan interview, Dr. Sethna said the exercise took 12 years for even a country like Japan. "How could we, who are nowhere as compared to Japan in terms of industrial capacity, hope to set up such a plant in the near future?" he asked.

Instead, India was concentrating on heavy water plants. The country intended to set up three heavy water plants. It already has three such plants at Tuticorin, Baroda and Nangal.

Dr Sethna said two plants were to be located at Thal in Maharashtra and at Minguru on the banks of the Godavari in Andhra Pradesh. The site for the third plant would be selected by the end of this year or early next year.

The two plants, which were expected to start functioning in 10 to 15 years, would help overcome India's difficulties in procuring heavy water, Dr Sethna said.

On the criticalisation of the Kalpakkam Atomic Power Station, he said the event was of great significance to the country. "With this, India joins the select band of the nuclear club countries" The plant was 99 per cent indigenous, he said.

Dr Sethna sought to dispel confusion regarding the difference between safeguards and safety in nuclear plants. Safeguards meant accounting for fission and other such processes, while safety involved "looking after ourselves".

Replying to a question on alternative energy sources, Dr Srinivagan, director, power projects, said harnessing nuclear power was necessary considering the country's limited energy sources and huge population.

He said India's coal reserves accounted for only four per cent of the world's total coal reserves. The US, USSR and China together accounted for 90 per

cent of the total coal reserves. "We don't have a large coal base and furthermore, It is not economic to burn coal".

He said nuclear power formed only two to three percent of the total electricity generated in the country At least 15 percent of the total electricity should be nuclear generated if it was to meet the country's requirements. [New Delhi PATRIOT in English 11 Jul 83 p 7]

CSO: 5100/7135

PROGRESS IN NUCLEAR TECHNOLOGY MAY BRING PRESSURE

Madras THE HINDU in English 24 Jul 83 p 12

[Article by G.K. Reddy]

[Text] New Delhi, 23 Jul.--After the first Indian nuclear explosion in 1974, no other event in the country's atomic programme has attracted such wide attention abroad as the commissioning of the Kalpakkam power plant through an entirely indigenous effort, according to diplomatic reports reaching here.

The foreign embassies in Delhi, which have been closely following India's steady progression towards self-reliance in this field of high technology, are making no secret of their sneaking admiration for the success achieved in mastering the scientific complexities of operating the entire fuel cycle.

But this grudging recognition of India's ability to achieve a breakthrough in the nuclear field, by moving forward step by step from the present generation of uranium-based power reactors to fast breeders using plutonium and thorium, reflects the growing concern in the West, especially in the United States, that the country is able to resist successfully the mounting pressures for more restrictions in the name of non-proliferation.

Main interest: The Western diplomats, who are well acquainted with nuclear politics, have been attaching greater significance to the development of India's research programme at Trombay than the utilisation of this knowledge for harnessing atomic energy for peaceful uses. Their main interest is focused on the wholly indigenous R-5 research reactor that is being built because it is supposed to yield plutonium of high purity in sizable quantities enough to give India the nuclear option.

The scientific attaches of some of the Western embassies admit privately that the fuss their Governments have been making about the hazards of letting India reprocess the safeguarded spent fuel at Tarapur and Rajasthan plants is more political than technical in the sense that the plutonium obtained from it is not good enough for explosive purposes. But these powers have been opposing reprocessing simply to compel India to submit to fuller safeguards on its entire nuclear programme.

Russia too: An important feature of the mounting international pressure on India is that the Soviet Union is no less vehement than the U.S. in its advocacy of stricter international controls even on the uses of nuclear energy for peaceful purposes. Though it has not been openly lining up with Washington for twisting India's arms, Moscow has not hesitated to apply the pursuit and perpetuity clauses through the IAEA to the heavy water it promised to provide at one stage for the Kalpakkam plant.

The Indian officials who have been conducting the country's nuclear diplomacy expect a further intensification of international pressures, in one form or the other, as India proceeds with its efforts to master the fast breeder technology, besides intensifying its research to develop the thorium fuel cycle. In trying to prevent India from reprocessing the safeguarded spent fuel at Tarapur without submitting to stricter conditions on the uses of the lower grade plutonium derived from it, the U.S. is hoping to compel India indirectly to utilise the higher grade plutonium from the research reactors including the R-5 under construction for its fast breeder programme, instead of stockpiling it.

And even if India has no intention of using this high grade plutonium for conducting further tests or making nuclear weapons, it cannot allow other powers to restrict its utilisation for any single purpose by preventing the country from reprocessing the fuel wastes to recycle the plutonium derived from it.

CSO: 5100/7137

BRIEFS

URANIUM TRACES FOUND--JAIPUR, July 3--Traces of Uranium have been found in the Dariba mines in Alwar district of Rajasthan. After a preliminary survey by local Copper Mines Project officials in Dariba, a team from the Atomic Energy Commission visited the site and took samples for investigation. Another team from the Bhabha Atomic Research Centre expressed the view that it was possible to find traces of uranium in this rich mineral region of the Aravali tract. [Madras THE HINDU in English 4 Jul 83 p 16]

PUNJAB NUCLEAR PLANT PLEA--NEW DELHI, July 6--The Punjab Chief Minister, Mr. Darbara Singh, said today that he had strongly pleaded with the Centre to set up a nuclear power station in the state. He said that the immediate sanction of a nuclear plant for Punjab was the only answer to bridge the gap between the enormous increase in demand and the limited supply of power in Punjab. Justifying his claim for a nuclear power plant in the State, the Chief Minister said that Punjab is situated far off from the coal pitheads and all its available hydro sources of energy will have been tapped in the near future with the completion of the on-going projects culminating with the completion of the Thein dam. The Punjab Chief Minister said that the State had 335,000 pump sets running on electricity. It had to pay heavily in tariff to maintain the supply of power to the agriculture sector. For this, Punjab was incurring a loss of Rs 100 crores a year. The setting up of a nuclear power plant in the State would compensate for this expenditure. [Calcutta THE STATESMAN in English 7 Jul 83 p 14]

CSO: 5100/7134

ISRAEL

RESEARCH PROJECT WORKING ON NUCLEAR REACTOR, FUEL

Tel Aviv MA'ARIV in Hebrew 24 Jul 83 p 16

[Article by Avraham Peleg: "Researchers Developing Nuclear Reactor and Fuel Based on Uranium and Thorium"]

[Text] A series of high-interest research projects are now underway in the Department of Nuclear Engineering of the Ben-Gurion University in the Negev. In an interview with MA'ARIV, the head of the department, Prof Gad Shani, talks about its activity. The main areas of work are nuclear reactors and nuclear fuel for application in power plants and uses of nuclear radiation for medical purposes.

The department is now involved in the research and development of a reactor fueled by a fuel that is a mixture of uranium and thorium. Such a development is known to have several advantages: Such a fuel is more efficient and permits double usage in comparison to the normal nuclear fuel of today. Such a reactor is not a source for plutonium, the material used for the production of nuclear bombs.

Countries with nuclear technology now hesitate, or avoid, selling nuclear reactors out of concern that the plutonium, that is produced during the operation of the reactor, will be used for military purposes or that the reactor will be used in another way to produce nuclear bombs in that the fuel of such reactors, uranium 235, can, in itself, be used for military purposes.

As is known, the United States refuses to sell Israel nuclear power plants so long as the government of Israel is not a signatory to the Nuclear Non-proliferation Treaty. In other words, for several years now this has been an obstacle to Israel's acquisition of nuclear reactors in the United States.

Radkovsky Reactor

A researcher in the Department of Nuclear Engineering of the Ben-Gurion University, Prof Elvin Radkovsky, conceived the idea of a new technology in the field of nuclear reactors and fuel. He proposes to build reactors fueled by a mixture of uranium and thorium instead of uranium 235. In addition to the technological advantages of such a reactor, it will have great political importance. It will be free of the limitations stemming from the military projections of nuclear technology. In other words, the Radkovsky reactor has no military potential but only an energy potential.

As was stated, the reactor will be fueled by a mixture that contains thorium, a material that is converted to uranium 233 in the reactor. In the nuclear process in which this fuel is mixed, plutonium is not produced as a by-product. Also, uranium 233 is a very radioactive material that is difficult to separate, and it also extinguishes rapidly.

In the first stage of the process, the uranium in the mixture serves as a fuel that produces energy in the reactor, however during the operation of the reactor, part of the thorium becomes uranium 233 which is the primary fuel of the new reactor.

Uranium 233

The reactor designated for this fuel is from the newer generation called "breeder reactors." The "conventional" nuclear reactor is charged with between 70 and 100 tons of uranium enriched with 3 percent of uranium 235. Once a year 1/3 of the fuel is replaced so that at the end of 3 years all of the original fuel is replaced. In the Radkovsky reactor the process is more efficient because during the operation of the breeder reactor, a fuel, uranium 233, is produced from the thorium. Also, it is not necessary to fuel it once a year.

The uranium and thorium fuel is not suitable for reactors as they are today, however it is possible to convert the reactors for use of this fuel.

Two groups of researchers are now involved in the research on the new reactor and fuel at Ben-Gurion University. One, headed by Prof Radkovsky, is involved in planning the reactor. The other, headed by Prof Ze'ev Hadari, is involved in the development of the fuel in the laboratory. Actually, the fuel will be uranium oxide and thorium oxide.

Power Plant

According to Prof Radkovsky's projection, it will be possible to use the new nuclear fuel in existing nuclear reactors provided that they have been retrofitted. The development and production of the new reactor are likely to take several years and require large investments. In the first stage, that will take 2 years, the theoretical planning of the reactor and the development of the fuel in the laboratory will be completed. In the next stage, that will take about 5 years, tests of the fuel will be conducted in Germany or the United States. At the end of the two stages, that will take about 7 years, the construction of the nuclear power plant will begin.

The investment in the first stage is estimated at \$600,000 and in the second stage, between \$5 million and \$10 million. The Ministry of Energy and Infrastructure is participating in the funding of the project. A part of the investment is being made by a group of Jewish investors in the United States. This group has sought the opinion of physicists and Nobel Prize winners including Prof Edward Teller, Hans Bethe, and Breit Wigner. All of them were enthusiastic about the idea.

Because of the enormous investments in the project until its completion, that is, the development of the fuel and the reactor, Israel will be unable to fund the research and development all the way. Israel's contribution, therefore, will conclude with the development of the technology and making the know-how available for sale to manufacturers of nuclear reactors and fuel throughout the world. The project in itself is likely to be started in the near future with the signing of the appropriate contracts.

An additional project that is underway in the department has considerable importance in the development of nuclear energy in Israel. The department is setting up a current circuit designed to study the apparatuses for extracting the energy from the heart of the reactor. The system will include rods similar to the fuel rods in a nuclear reactor that will be heated by electrical power and the current system for extracting energy produced by these rods.

This is a \$200,000 project, and it is funded by the Council for Higher Education, the Ministry of Energy, Ben-Gurion University, and other bodies. The research will provide data that will be helpful in the construction of safe and more efficient reactors.

Fusion Reactors

In the Department of Nuclear Engineering there is a small accelerator (neutron generator) in which there occurs a nuclear reaction of the kind that takes place in the fusion reactors. In such reactors -- which will apparently become operational only in the 21st century -- the fuel is produced through the operation of the reactor by the bombardment of particles called neutrons of lithium. This bombardment produces tritium, an isotope of hydrogen, which, it is hoped, will be the nuclear fuel of the future.

Researchers of the department in Ben-Gurion University are studying with the aid of the accelerator the production of tritium in this process. As is known, the Inesco Company is now involved in Israel in setting up fusion reactor research teams.

In another area, the department scientists are now involved in a research project that has medical implications. In this research, systems are being developed for the early diagnosis of cancerous growths, primarily in the brain, by means of nuclear scanning.

1530
CSO: 5100/4509

PAKISTAN

PAPER ON 'DUPPLICITY' OF U.S. NUCLEAR POLICY

GF181328 Islamabad THE MUSLIM in English 11 Aug 83 p 4

[Editorial: "U.S. Nuclear Duplicity"]

[Text] In his interest in establishing an "arms relationship" with India, a desire which Mr Reagan expressed to his aides soon after Mrs Gandhi's visit to Washington, the U.S. President obviously wants to woo the powerful prime minister of India in the fond hope of weaning her away from the "treaty of friendship and cooperation" with Moscow which has been of immense benefit to her country. That, however, is not our concern. What is irksome to Pakistan is the discriminatory treatment accorded to this country in the context of our very modest nuclear facilities geared only to the production of electrical energy. Not an eyebrow is raised in Washington over the nuclear capabilities of Israel, South Africa and even India, all three of whom can well be reckoned as nuclear powers. While Tel Aviv is known to possess nuclear weapons and Pretoria has also stolen into the nuclear club, India, according to Western estimates, is capable of producing ten atomic bombs every year equal in their fission to the atomic bombs which devastated Hiroshima and Nagasaki in 1945.

Despite President Zia's repeated assurance that Pakistan has neither the capability nor the desire to produce nuclear weapons, or even to make a nuclear explosion, Western powers have been prone to persist in their pathological suspicion of this country's intentions without even so much as a shred of evidence to lend strength to the figment of their fancy. They insist that Islamabad sign the nonproliferation treaty which this country is ready to sign if its immediate neighbour, India, also does so. Mr Reagan, who is now willing to sell nuclear reactor parts to New Delhi, seems unwilling to make the sales conditional on India signing the treaty prior to the despatch of the parts required. The question involved is one of Pakistan's independence as well as upholding the principle of uniformity. Both aspects seem distant from U.S. concerns in the nuclear field.

CSO: 5100/4728

DEADLINE FOR CHASHMA TENDERS ENDS

Karachi DAWN in English 3 Aug 83 p 10

[Text]

ISLAMABAD, Aug. 2: The deadline for receiving international tenders for the 937 MW Chashma Nuclear Power Project ended on Monday night. But it was not known till Tuesday evening as to how many tenders had been received or which countries' contractors submitted the tenders.

It is hoped that some information about the tenders will be known on Wednesday. The tenders were floated on Dec. 1, 1982 and stipulated bids either on turn-key basis or on parts. The financing of foreign exchange cost is to be arranged by the contractors.

The Chashma Nuclear Power Project is estimated to cost 1.7 billion dollars (approx Rs. 200 crore) including 60 per cent cost in foreign exchange and is scheduled to be commissioned by 1990. Annual fueling cost is projected around 40 million dollars.

It is expected that the contractors will give five years' supply of the fuel and 15 years' supply of the materials required for operating the Chashma project. The project will be open to international inspection per the IAEA (International Atomic Energy Agency) safeguards. Five more nuclear power plants are projected for Pakistan in course of time to meet its rising need for energy.

The Chashma Nuclear Power Project is to be sited on the left bank of the Indus in Mianwali district at the place called Chashma, which was selected after about 7 years of investigation as to its suitability.

Intensive geological and seismological survey and investigations were carried out. Authorities assure that there is no fear of pollution of Indus, and the cooling water discharged by the nuclear plant will be fit for drinking.

CSO: 5100/4726

PAKISTAN

BRIEFS

CHASHMA CONSTRUCTION SCHEDULE--ISLAMABAD, July 23--The construction of the 900 megawatt Cashma nuclear power project will start by the middle of next year. This was stated by Pakistan Atomic Energy Commission Chairman Munir Ahmad Khan while addressing the eighth International Summer College on Physics and Contemporary Needs here today. Munir Ahmad Khan said that response to the called for this plant had been very encouraging. Pakistan with its very limited energy resources, had no other option but to rely on nuclear power as a major contributor to our energy generation. With this in view, the Government was now embarking upon the 900 mw nuclear power project to be commissioned by 1990. [Karachi BUSINESS RECORDER in English 24 Jul 83 p 3]

CSO: 5100/4726

'KOEBERG ALERT' MEDIA OFFICER COMMENTS ON NUCLEAR POWER PLANT

Capetown THE CAPE TIMES in English 15 Jul 83 p 5

[Text]

THE LIVES of 800 000 residents of Cape Town and Atlantis would be affected by an accident at the Koeberg nuclear power station, the media officer of Koeberg Alert, Dr Derek Yach, told the Institute of Mechanical Engineers in Cape Town last night.

Speaking at a well-attended public meeting called to air opinion on Koeberg, Dr Yach said two factors, related to the siting of Koeberg and the disposal of waste, caused concern.

"We are told by Escom that Koeberg is a safe distance from population concentrations. The International Atomic Energy Agency does not set limits for nuclear plants, but advises that distances should be calculated only after considering local meteorological and topographical conditions.

"The arbitrary decision to place Koeberg 12.5km from Cape Town cannot be validated."

Dr Yach quoted the Medical Officer of Health, Dr R J Coogan, as saying matter released could reach Sea Point and even Newlands in two hours.

"Assuming no panic or traffic jams occurred, a maximum of 37 000 people an hour could be evacuated. It would take two days for the complete evacuation," said Dr Yach.

In spite of Escom and Atomic Energy Board assurances, no safe means of radioactive waste disposal had been devised. Now to be dumped in Namaland, it could result in human and environmental hazards for tens of thousands of years and effect the genetic make-up of future generations.

Dr Yach also said Escom's claims that Koeberg was vitally needed by commerce and industry in the Western Cape were unfounded.

"With assets of R13-billion and large foreign and local loans to repay, Escom needs to continually increase electricity consumption to improve its income. It therefore does not pay Escom to promote either alternative means of electricity production or energy conservation programmes," Dr Yach said.

In summary he said that Koeberg Alert be-

lieved Koeberg was uneconomic, unsafe and would result in unacceptable restrictions on citizens through the Nuclear Energy Act.

● The biological effects of radiation had been well documented and radiation levels around Koeberg would be well below international minimum standards once the power station went on stream. Dr Brian Fitzpatrick, health physicist at the power station, said at the meeting.

An area within a radius of 30km from the station was continually being monitored and Koeberg scientists had access to a great deal of literature on radiation from all over the world.

Research had proved the natural radiation in many parts of the world was higher than the artificially-induced radiation from Koeberg.

● Dr David Sykes, of the Institute of Nuclear Engineering, said South Africa would have a dire need for nuclear power in years to come. Oil was running out fast and energy developed by solar devices would be "inadequate".

CSO: 5100/49

NORWAY

POLL: OVERWHELMING MAJORITY OPPOSE NUCLEAR POWER

Oslo AFTENPOSTEN in Norwegian 17 Aug 83 p 3

[Excerpt] An entire 86 percent of the population in this country think that building of nuclear power plants is not acceptable, as appears from a survey of opinion carrier out by Scan-Fact for The Electricity Supply Information Service.

Opposition has increased in comparison to a corresponding poll in 1979, when 78 percent answered "no" to a question on whether they favored nuclear power. The number of those saying "yes" to nuclear power has also increased, up from seven to ten percent of those queried. The "don't know" group declined from 15 to four percent.

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